IN THE CLAIMS

After granting a filing date to this continuation application, please cancel claim 1 and add new claims 10-46 as set forth below.

--~~10~~. A pattern forming method comprising the steps of:

preparing a semitransparent phase shifting mask including (a) a semitransparent phase shifting pattern formed at a predetermined position on a photomask substrate and (b) a light shielding area provided at a peripheral edge portion of said semitransparent phase shifting pattern and serving to make an intensity of light having passed through said light shielding area smaller than an intensity of light having passed through said semitransparent phase shifting film, as measured on a to-be-exposed film; and

exposing, with a projection exposure optical system, said to-be-exposed film by use of said semitransparent phase shifting mask.

--~~11~~. A pattern forming method ~~of~~ comprising the steps of:

preparing a semitransparent phase shifting mask including (a) a first semitransparent phase shifting pattern having a semitransparent phase shifting film, said phase shifting film being formed at a predetermined position on a photomask substrate and having a transmittance with respect to exposure light not higher than 25% and (b) a light shielding area provided at a peripheral edge portion of said first

semitransparent phase shifting pattern and serving to make an intensity of light having passed through said light shielding area smaller than an intensity of light having passed through said semitransparent phase shifting film, as measured on a to-be-exposed film;

preparing a substrate having a to-be-exposed film; and

exposing, with a projection exposure optical system, said to-be-exposed film to said exposure light by use of said semitransparent phase shifting mask.

3 --~~12~~. A method according to claim ~~11~~, wherein said light shielding area includes a second semitransparent phase shifting pattern having a semitransparent phase shifting portion and a transparent portion, ~~said second semitransparent phase shifting pattern being comprised of a pattern beyond a critical resolution of an exposure apparatus.~~

4 --~~13~~. A method according to claim 3, wherein a ratio α of an area of said transparent portion to an area of said semitransparent phase shifting portion is defined as $\alpha = \beta\sqrt{T}$, where T represents a transmittance of said semitransparent phase shifting portion, and β represents a value in a range $0.5 \leq \beta \leq 2.0$.

5 --~~14~~. A method according to claim 2, wherein a light shielding portion is provided within a region for said first semitransparent phase shifting pattern, said light shielding portion serving to make an intensity of light having passed through said light shielding portion smaller than an intensity

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of light having passed through said semitransparent phase shifting film, as measured on a to-be-exposed target.

--~~15~~ 6. A method according to claim ~~11~~ 2, wherein a transparent pattern is provided within said light shielding area to be transferred onto said to-be-exposed film.

--~~16~~ 7. A method according to claim ~~11~~ 2, wherein said first semitransparent phase shifting pattern is a pattern for forming a device.

--~~17~~ 8. A pattern forming method comprising the steps of:

mounting a substrate having a photoresist film, on a sample stage of an aligner having a masking blade;

mounting, on a mask support of said aligner, a semitransparent phase shifting mask including (a) a semitransparent phase shifting pattern formed at a predetermined position on a photomask substrate and (b) a light shielding area provided at a peripheral edge portion of said semitransparent phase shifting pattern and serving to make an intensity of light having passed through said light shielding area smaller than an intensity of light having passed through said semitransparent phase shifting film, as measured on said photoresist film; and

exposing said photoresist film by use of said semitransparent phase shifting mask.

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--~~18~~ 9. A pattern forming method comprising the steps of:

mounting a substrate having a to-be-exposed film, on a sample stage of an aligner having a masking blade;

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mounting, on a mask support of said aligner, a semitransparent phase shifting mask including (a) a first semitransparent phase shifting pattern having a semitransparent phase shifting film, said phase shifting film being formed at a predetermined position on a photomask substrate and having a transmittance with respect to exposure light not higher than 25% and (b) a light shielding area provided at a peripheral edge portion of said first semitransparent phase shifting pattern and serving to make an intensity of light having passed through said light having passed through said semitransparent phase shifting film, as measured on a to-be-exposed film;

exposing a first area of said to-be-exposed film by use of said semitransparent phase shifting mask;

moving said sample stage in a horizontal direction; and

exposing a second area, different from said first area, of said to-be-exposed film by use of said semitransparent phase shifting mask.

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10 ~~--19~~. A method according to claim ~~18~~, wherein said light shielding area includes a second semitransparent phase shifting pattern having a semitransparent phase shifting portion and a transparent portion~~, said second semitransparent phase shifting pattern being comprised of a pattern beyond a critical resolution of an exposure apparatus~~.

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--~~20~~ 11. A method according to claim ~~19~~ 10, wherein a ratio α of an area of said transparent portion to an area of semitransparent phase shifting portion is defined as $\alpha = \beta\sqrt{T}$, where T represents a transmittance of said semitransparent phase shifting portion, and β represents a value in a range $0.5 \leq \beta \leq 2.0$.

--~~21~~ 12. A method according to claim ~~18~~ 9, wherein a light shielding portion is provided within a region for said first semitransparent phase shifting pattern, said light shielding portion serving to make an intensity of light having passed through said light shielding portion smaller than an intensity of light having passed through said semitransparent phase shifting film, as measured on a to-be-exposed film.

--~~22~~ 13. A method according to claim ~~18~~ 9, wherein a transparent pattern is provided within said light shielding area to be transferred onto said to-be-exposed film.

~~23~~ 14. A method according to claim ~~18~~ 9, wherein said first semitransparent phase shifting pattern is a pattern for forming a device.

~~24~~ 15. A method according to claim ~~18~~ 9, wherein said second area includes a portion of said to-be-exposed film which is shielded by said light shielding area in said step of exposing said first area of said to-be-exposed film.

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--~~25~~ 16. A method of manufacturing a semiconductor device, comprising the steps of:

preparing a semitransparent phase shifting mask including (a) a first semitransparent phase shifting pattern for formation of a semiconductor device having a semitransparent phase shifting film, said phase shifting film being formed at a predetermined position on a photomask substrate and having a transmittance with respect to exposure light not higher than 25% and (b) a light shielding area provided at a peripheral edge portion of said first semitransparent phase shifting pattern and serving to make an intensity of light having passed through said light shielding area smaller than an intensity of light having passed through said semitransparent phase shifting film, as measured on a to-be-exposed film;

preparing a substrate having a to-be-exposed film; and

exposing, with a projection exposure optical system, said to-be-exposed film to said exposure light by use of said semitransparent phase shifting mask.

--~~26~~ 17. A method according to claim ~~25~~ 16, wherein said light shielding area includes a second semitransparent phase shifting pattern having a semitransparent phase shifting portion and a transparent portion~~, said second semitransparent phase shifting pattern being comprised of a pattern beyond a critical resolution of an exposure apparatus~~.

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--~~27~~ 18. A method according to claim ~~26~~ 17, wherein a ratio α of an area of said transparent portion to an area of semitransparent phase shifting portion is defined as $\alpha = \beta\sqrt{T}$, where T represents a transmittance of said semitransparent phase shifting portion, and β represents a value in a range $0.5 \leq \beta \leq 2.0$.

--~~28~~ 19. A method according to claim ~~25~~ 16, wherein a light shielding portion is provided within a region for said first semitransparent phase shifting pattern, said light shielding portion serving to make an intensity of light having passed through said light shielding portion smaller than an intensity of light having passed through said semitransparent phase shifting film, as measured on a to-be-exposed target.

--~~29~~ 20. A method according to claim ~~25~~ 16, wherein a transparent pattern is provided within said light shielding area to be transferred onto said to-be-exposed film.

--~~30~~ 21. A method of manufacturing a semiconductor device, comprising the steps of:

mounting a substrate having a to-be-exposed film, on a sample stage of an aligner having a masking blade;

mounting, on a mask support of said aligner, a semitransparent phase shifting mask including (a) a first semitransparent phase shifting pattern for formation of a semiconductor device having a semitransparent phase shifting film, said phase shifting film being formed at a predetermined position on a photomask substrate and having a transmittance

with respect to exposure light not higher than 25% and (b) a light shielding area provided at a peripheral edge portion of said first semitransparent phase shifting pattern and serving to make an intensity of light having passed through said light shielding area smaller than an intensity of light having passed through said semitransparent phase shifting film, as measured on a to-be-exposed film;

exposing a first area of said to-be-exposed film by use of said semitransparent phase shifting mask;

moving said sample stage in a horizontal direction; and

exposing a second area, different from said first area, of said to-be-exposed film by use of said semitransparent phase shifting mask.

22 --~~31~~. A method according to claim ~~30~~ 21 wherein said light shielding area includes a second semitransparent phase shifting pattern having a semitransparent phase shifting portion and a transparent portion. ~~said second semitransparent phase shifting pattern being comprised of a pattern beyond a critical resolution of an exposure apparatus.~~

23 --~~32~~. A method according to claim ~~31~~ 22, wherein a ratio α of an area of said transparent portion to an area of said semitransparent phase shifting portion is defined as $\alpha = \beta\sqrt{T}$, where T represents a transmittance of said semitransparent phase shifting portion, and β represents a value in a range $0.5 \leq \beta \leq 2.0$.

--~~33~~ 24. A method according to claim ~~31~~ 22, wherein a light shielding portion is provided within a region for said first semitransparent phase shifting pattern, said light shielding portion serving to make an intensity of light having passed through said light shielding portion smaller than an intensity of light having passed through said semitransparent phase shifting film, as measured on a to-be-exposed target.

--~~34~~ 25. A method according to claim ~~31~~ 22, wherein a transparent pattern is provided within said light shielding area to be transferred onto said to-be-exposed film.

--~~35~~ 26. A method of manufacturing a semiconductor device, comprising the steps of:

forming an impurity-doped layer in a predetermined region of a semiconductor substrate;

forming an insulating film on said semiconductor substrate having said doped layer formed therein;

forming a photoresist film on said insulating film;

mounting said substrate having said photoresist film, on a sample stage of an aligner having a masking blade;

mounting, on a mask support of said aligner, a semitransparent phase shifting mask including (a) a first semitransparent phase shifting pattern for formation of a hole having a semitransparent phase shifting film, said phase shifting film being formed at a predetermined position on a photomask substrate and having a transmittance with respect to exposure light not higher than 25% and (b) a light shielding

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area provided at a peripheral edge portion of said first semitransparent phase shifting pattern and serving to make an intensity of light having passed through said light shielding area smaller than an intensity of light having passed through said semitransparent phase shifting film, as measured on said photoresist film; and

exposing a first area of said photoresist film by use of said semitransparent phase shifting mask;

moving said sample stage in a horizontal direction;

exposing a second area, different from said first area, of said photoresist film by use of said semitransparent phase shifting mask; and, thereafter

etching said insulating film to form a hole above said impurity doped layer.

--27. A method of manufacturing a semiconductor device, comprising the steps of

forming a wiring layer above a predetermined region of a semiconductor substrate;

forming an insulating film on said semiconductor substrate having said wiring layer formed thereabove;

forming a photoresist film on said insulating film;

mounting said substrate having said photoresist film, on a sample stage of an aligner having a masking blade;

mounting, on a mask support of said aligner, a semitransparent phase shifting mask including (a) a first semitransparent phase shifting pattern for formation of a hole

having a semitransparent phase shifting film, said phase shifting film being formed at a predetermined position on a photomask substrate and having a transmittance with respect to exposure light not higher than 25% and (b) a light shielding area provided at a peripheral edge portion of said first semitransparent phase shifting pattern and serving to make an intensity of light having passed through said light shielding area smaller than an intensity of light having passed through said semitransparent phase shifting film, as measured on said photoresist film; and

exposing a first area of said photoresist film by use of said semitransparent phase shifting mask;

moving said sample stage in a horizontal direction;

exposing a second area, different from said first area, of said photoresist film by use of said semitransparent phase shifting mask; and, thereafter

etching said insulating film to form a hole above said wiring layer.

--~~37~~ 28. A method of manufacturing a semiconductor device, comprising the steps of:

preparing a semitransparent phase shifting mask including (a) a first semitransparent phase shifting pattern for formation of a semiconductor device having a semitransparent phase shifting film, said phase shifting film being formed at a predetermined position on a photomask substrate and having a transmittance with respect to exposure light not higher than

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25% and (b) a light shielding area provided at a peripheral edge portion of said first semitransparent phase shifting pattern;

preparing a substrate having a to-be-exposed film, said light shielding area of said semitransparent phase shifting mask serving to make an intensity of light having passed through said light shielding area not larger than 0.05, as measured on said to-be-exposed film; and

exposing, with a projection exposure optical system, said to-be-exposed film to said exposure light by use of said semitransparent phase shifting mask.

--~~38~~ 29. A method according to claim ~~37~~ 28, wherein said light shielding area includes a second semitransparent phase shifting pattern having a semitransparent phase shifting portion and a transparent portion~~, said second semitransparent phase shifting pattern being comprised of a pattern beyond a critical resolution of an exposure apparatus~~.

--~~39~~ 30. A method according to claim ~~38~~ 29, wherein a ratio α of an area of said transparent portion to an area of said semitransparent phase shifting portion is defined as $\alpha = \beta\sqrt{T}$, where T represents a transmittance of said semitransparent phase shifting portion, and β represents a value in a range $0.5 \leqq \beta \leqq 2.0$.

--~~40~~ 31. A method according to claim ~~37~~ 28, wherein a light shielding portion is provided with a region for said first semitransparent phase shifting pattern, said light shielding

portion serving to make an intensity of light having passed through said light shielding portion smaller than an intensity of light having passed through said semitransparent phase shifting film, as measured on a to-be-exposed target.

--41. A method according to claim 37, wherein a transparent pattern is provided within said light shielding area to be transferred onto said to-be-exposed film.

--42. A method of manufacturing a semiconductor device, comprising the steps of:

mounting a substrate having a to-be-exposed film, on a sample stage of an aligner having a masking blade;

mounting, on a mask support of said aligner, a semitransparent phase shifting mask including (a) a first semitransparent phase shifting pattern for formation of a semiconductor device having a semitransparent phase shifting film, said phase shifting film being formed at a predetermined position on a photomask substrate and having a transmittance with respect to exposure light not higher than 25% and (b) a light shielding area provided at a peripheral edge portion of said first semitransparent phase shifting pattern and serving to make an intensity of light having passed through said light shielding area not larger than 0.05, as measured on said to-be-exposed film;

exposing a first area of said to-be-exposed film by use of said semitransparent phase shifting mask;

moving said sample stage in a horizontal direction;

exposing a second area, different from said first area, of said to-be-exposed film by use of said semitransparent phase shifting mask.

--~~43~~. A method according to claim ~~42~~, said light shielding area includes a second semitransparent phase shifting pattern having a semitransparent phase shifting portion and a transparent portion. ~~said second semitransparent phase shifting pattern being comprised of a pattern beyond a critical resolution of an exposure apparatus.~~

--~~44~~. A method according to claim ~~43~~, wherein a ratio α of an area of said transparent portion to an area of said semitransparent phase shifting portion is defined as $\alpha = \beta\sqrt{T}$, where T represents a transmittance of said semitransparent phase shifting portion, and β represents a value in a range $0.5 \leq \beta \leq 2.0$.

--~~45~~. A method according to claim ~~43~~, wherein a light shielding portion is provided within a region for said first semitransparent phase shifting pattern, said light shielding portion serving to make an intensity of light having passed through said light shielding portion smaller than an intensity of light having passed through said semitransparent phase shifting film, as measured on a to-be-exposed target.

--~~46~~. A method according to claim ~~43~~, wherein a transparent pattern is provided within said light shielding area to be transferred onto said to-be-exposed film.--